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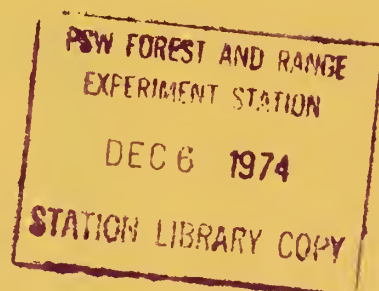
PNW-231

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OLD-GROWTH COAST DOUGLAS-FIR LOG GRADES--A DISTRIBUTION ANALYSIS OF EXISTING LOG GRADES WITH A NEW FOUR-GRADE SYSTEM

by

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ABSTRACT

Information is presented to allow veneer and sawmill processors and buyers of Coast Douglas-fir timber to compare distribution of logs by two grading systems. One system is the presently used Peeler-Sawmill system; the other is a new four-grade system developed by the Pacific Northwest Forest and Range Experiment Station.

Keywords: Log grading, Coast Douglas-fir.

The Pacific Northwest Forest and Range Experiment Station has developed a new four-grade log cruising system for old-growth Coast Douglas-fir (*Pseudotsuga menziesii*) sawtimber.^{1/}

Of interest to log buyers and processors, this Research Note compares the distribution of woods-length logs graded by the existing Peeler-Sawmill system^{2/} to bucked logs graded by a new four-grade system.

Approximately 1,000 old-growth^{3/} study trees were selected for log grade (see footnote 1) and product recovery studies from about 100 sample areas in Washington, Oregon, and California. About three-quarters of these trees were sawn at 10 sawmills, and the remaining one-quarter were processed at 10 veneer plants.

DISCUSSION

The information presented in this note is a tabulation of the 6,509 logs by two grading systems. Woods-length logs that were considered cull by the scalers have been omitted, even though after bucking one or more processing lengths were found to be merchantable (33-1/3 percent sound). The distribution of the logs graded under each system is shown as a percentage of the other system.

The following tabulation gives the number of processed or mill-length logs bucked from woods-length logs in each of the Peeler-Sawmill grades.

<u>Grade</u>	Number of:	
	<u>Woods-length logs</u>	<u>Bucked logs (mixed grades)</u>
1 Peeler	96	139
2 Peeler	108	172
3 Peeler	445	773
Special Peeler	214	400
1 Sawmill	5	10
2 Sawmill	1,776	3,039
3 Sawmill	<u>1,248</u>	<u>1,976</u>
Total	3,892	6,509

All logs placed in the highest grade under one system do not automatically fall into the highest grade under the other system. In developing the new grades, we found

^{1/} Paul H. Lane, Richard O. Woodfin, Jr., John W. Henley, and Marlin E. Plank. New timber cruising grades for Coast Douglas-fir. USDA Forest Service Research Paper PNW-151, 12 p., illus. Pacific Northwest Forest and Range Experiment Station, Portland, Oreg., 1973.

^{2/} USDA Forest Service R-6 supplement to National Forest Log Scaling Handbook for West-side Log Scaling, October 1965. USDA Forest Service Log Grade Description for Douglas-fir. Form R-6 2440-190 (March 1965).

^{3/} Old growth is defined as trees generally more than 100 years old.

that some logs graded by the existing system had high value product recovery but were often placed in a lower grade. This was due to the existing log grade specifications and not to errors in application of the grades.

Figure 1 shows the study logs in each of the existing log grades as distributed among the new four-grade log system.^{4/} This gives the percentage of processed or mill-length logs graded by the new system that were produced when woods-length logs graded by the existing Peeler-Sawmill system were bucked.

As shown in figure 1, a percentage of Grade 2 logs in the new system appears in the existing No. 1 Peeler log grade. From the 139 processed or mill-length logs that were bucked from the woods-length No. 1 Peeler grade logs, 110 logs or 79 percent were Grade 1 of the new system. The remaining 29 logs or 21 percent were graded as Grade 2. Likewise, small percentages of the new system's higher grade logs are distributed throughout the existing Peeler-Sawmill log grades. These differences resulted from grading characteristics in the new specifications such as basal scars, burls, butt swell, and logs being adjacent to cull logs.

^{4/} A synopsis of the new four-grade Coast Douglas-fir timber cruising grades is located at the end of this note.

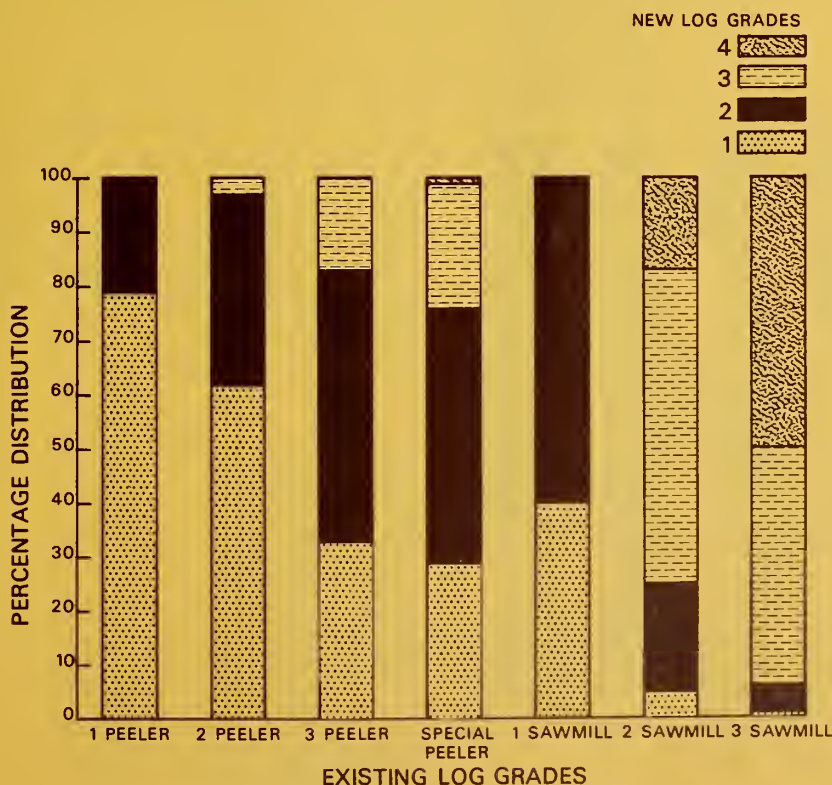


Figure 1.--Percent distribution of logs by the new grades within each of the existing grades.

These same grading characteristics apply to the other grades shown in figure 1. For example, in the No. 2 Peeler logs 3 percent of apparent Grade 2 logs dropped to Grade 3 in the new system because they were adjacent to a cull log.

In the No. 2 Sawmill and No. 3 Sawmill log grades, there was a small percentage of Grade 1 and 2 logs by the new system. These were high quality logs, free of degrading characteristics; but diameter limitations in the existing log grades caused these logs to be placed in the Sawmill log grades.

Figure 2 shows the study logs in each of the new log grades as distributed among the existing log grades. For example, 1,381 logs were graded as Grade 2 under the new system, and 28 percent of these or 385 logs came from woods-length logs graded as No. 3 Peeler. However, as shown in figure 1, about 50 percent or 385 logs of the woods-length No. 3 Peeler logs produced processed or mill-length Grade 2 logs.

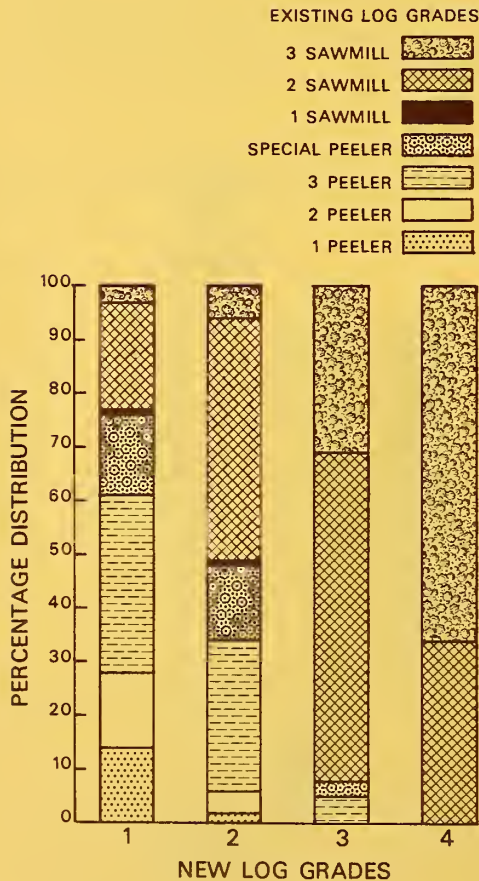


Figure 2.--Percent distribution of logs by the existing grades within each of the new grades.

January 1973

P. H. Lane, R. O. Woodfin, Jr., J. W. Henley, and M. E. Plank

TIMBER CRUISING GRADES FOR COAST DOUGLAS-FIR^{1/}

General grade specifications.--These log grades were developed for live, standing, old-growth coast type Douglas-fir. They can be applied to recently killed or blown down timber that has not deteriorated to the point that it is difficult to apply the grading specifications properly or that product yields would be materially affected.

1. Grades are for 16-foot "log" lengths, including trim allowance, as cruised in standing trees. Do not apply these grades to cull logs (logs less than one-third sound by cruise volume).
2. Although log diameter is not a grading criterion, the effect of grade and log size can best be reflected in local performance tables.
3. Some grading specifications are applied by log "faces." A log face is one-quarter of the circumference for the full length of the log.

Application of grades.--The following are suggested steps:

1. Size up each log with respect to knots, determining the poorest and best faces.
2. Establish grading faces. Once the grading faces on a log are established, they cannot be shifted, except for burls.
3. Apply knot or indicator specifications to determine preliminary grade of log; apply other criteria such as scars, conks, etc., to establish final grade.

Definitions:

1. Knots are sound, live, or dead limbs or limb stubs outside knot cluster.
2. Knot indicators are bark distortions which indicate underlying knots. Size is the vertical diameter of the depression in the center of the distortion.
3. Knot clusters are at least three limbs or stubs, 1 inch or larger, growing in an inseparable group. Knot size in the cluster is not considered.
4. Indicator clusters are three or more knot indicators usually well defined by a distorted bark pattern and surface rise.
5. Scars are injuries caused by fire, logging, frost, and lightning. Their condition, location, and size determine whether they are degrading and considered in the specifications or are superficial and can be disregarded.
A degrading scar has underlying wood that is decayed, excessively pitchy, severely checked, or otherwise injured to the extent that lumber or veneer recovery would be affected.
A superficial scar is shallow, open, sound, and of relatively recent origin and, in the cruiser's judgment, does not affect lumber or veneer recovery.
6. Conks indicate the presence of rot.
7. Cankers are mistletoe or rust lesions characterized by distorted bark, callous tissues, and pitch flow.
8. Rotten knots are live or dead limbs or stubs showing rot.
9. Sound burls are round or elliptical growths that protrude from the log surface and show no signs of decay.
10. Unsound burls are burls with decay and/or heavy pitch.
11. Bumps and bulges are bark covered surface swellings outside normal taper or normal butt swell.
12. Epicormic branches are sprout-type limbs, usually a half inch or less in diameter.
13. Holes are the result of bird peckings or insect activity into the cambium.

^{1/} For a more complete description of these grades refer to Research Paper PMW-151 by Paul H. Lane, Richard O. Woodfin, Jr., John W. Henley, and Marlin E. Plank.

GRADING SPECIFICATIONS FOR COAST DOUGLAS-FIR

Log characteristic	Grade 1	Grade 2	Grade 3	Grade 4
Knot (sound)	One allowed if 1 inch or less or one larger than 1 inch if within 6 inches of log end.	None allowed on two faces. Knots larger than 2 inches must be confined to upper or lower half of one face.	Knots (sound or rotten) larger than 3 inches must be confined to one face.	Any merchantable log not meeting requirements for Grade 3.
Rotten knot	None allowed.	None allowed unless log is otherwise Grade 1.		
Knot indicator	If larger than 1 inch, must be confined to no more than two faces.	No requirements.		
Knot cluster	None allowed.	One if confined to one face.	Any number if confined to no more than two faces.	
Indicator cluster	One allowed if confined to one face.	No requirements.		
Degrading scar	None allowed from ground line to 8 feet. Above 8 feet: No limit for sound scars 6 inches x 6 inches or smaller; larger sound scars must be confined to either one face or not more than two faces in any one-fourth of log length. No rotten scars allowed.	All scars having rot must be confined to one face.	No requirements.	
Sound burl ^{2/}	Disregard burls if less than 6 inches in diameter. If larger than 6-inch diameter, must be confined to one face.			
Conk, canker, and unsound burl	None allowed.	None allowed unless log is otherwise Grade 1.	No requirements	
Bump and bulge	None 6 inches x 6 inches or larger allowed from ground line to 8 feet. No requirements above 8 feet.	No requirements.		
Epicormic branches and holes	Must be confined to one face.			

^{1/} A log meeting specifications for either Grade 1, 2, or 3 is lowered one grade if adjacent to a cull log.

^{2/} When burls are considered, log faces can be shifted from the faces initially established for knots or other characteristics.

The mission of the PACIFIC NORTHWEST FOREST AND RANGE EXPERIMENT STATION is to provide the knowledge, technology, and alternatives for present and future protection, management, and use of forest, range, and related environments.

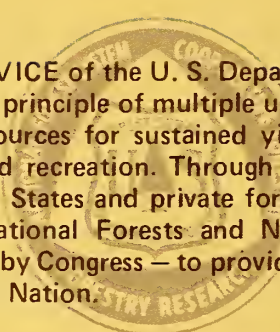
Within this overall mission, the Station conducts and stimulates research to facilitate and to accelerate progress toward the following goals:

1. Providing safe and efficient technology for inventory, protection, and use of resources.
2. Development and evaluation of alternative methods and levels of resource management.
3. Achievement of optimum sustained resource productivity consistent with maintaining a high quality forest environment.

The area of research encompasses Oregon, Washington, Alaska, and, in some cases, California, Hawaii, the Western States, and the Nation. Results of the research will be made available promptly. Project headquarters are at:

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Juneau, Alaska	Olympia, Washington
Bend, Oregon	Seattle, Washington
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